

81330

MEMORANDUM

CH2M HILL

TO: Alice Fuerst/EPA REGION IIV

DATE: September 27, 1988

FROM: Jerry May

SUBJECT: Screen analysis of chat samples from Galena site

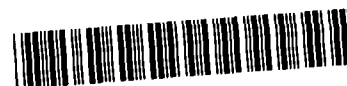
During the field sampling episode conducted at the Galena subsite to collect samples for metallurgical testing, it was found that several of the chat piles at the site possibly contained high concentrations of lead and zinc. These high concentrations were noted during field analysis using a portable X-ray fluorescence spectrometer (XRF).

To substantiate these claims, samples from four chat piles were sent to a laboratory for analysis. Each of the four individual samples were split into fourths using a jones type splitter. One of the fourths was prepared for total metal analysis of the bulk sample. One of the remaining fourths was dry screened at 80 mesh and the -80 mesh fraction and the +80 mesh fraction was weighed then prepared for metals analysis. Each sample was analyzed for arsenic, cadmium, lead, and zinc, the results of the laboratory analysis are listed in Table 1.

Dry screening was done to prevent any soluble lead compounds from being lost during the screening. Dry screening will also represent some lack of efficiency because of the very small particles adhering to the larger and being transported to other size fractions, but this will be very minor.

As can be seen in Table 1, the lead is concentrated in the minus 80 mesh fraction of the sample for samples 01-02 and 07-01. For sample 01-02, the minus 80 mesh fraction represents only 8.34 percent of the total sample weight, but contains 42 percent of the lead. The same can be seen in sample 07-01 where 13.21 percent of the total sample weight contains 35 percent of the lead. The same holds true for zinc in sample 07-01, where 13.21 percent of the sample weight contains 35 percent of the zinc.

To further investigate which size fractions may contain the majority of the lead and zinc metals, additional samples were collected and screening was done. Samples from location 07-01 and 01-02 were wet screened at intervals between +3 mesh and -400 mesh and analyzed for lead, zinc and cadmium. Table 2 shows the results of these tests. As can be seen from Table 2 the lead and zinc values are concentrated in the fine fractions. For sample 07-01, twelve percent of the sample weight contains approximately 50 percent of the lead, zinc and cadmium. For samples 01-02, twelve percent of the sample weight contains 72 percent of the lead and 50 percent of the zinc and cadmium values.



S00082297
SUPERFUND RECORDS

TABLE 1
ANALYSIS AND SCREEN DATA OF
CHAT SAMPLES FROM GALENA, KANSAS

SAMPLE NUMBER	SAMPLE DISCRIPTION	ARSENIC mg/kg	CADMIUM mg/kg	LEAD mg/kg	ZINC mg/kg	WEIGHT grams	FRACTION		CAL LEAD mg/kg	CAL ZINC mg/kg
							WEIGHT OF TOTAL	FRACTION OF TOTAL		
							%	LEAD	ZINC	
01-02	Bulk	3.9	6.3	4580	1600	437.8				4565 1314
01-02	+80 mesh	4.3	5.4	2870	1360	401.3	91.66			
01-02	-80 mesh	8.8	2.4	23200	805	36.5	8.34	0.42	0.04	
06-01	Bulk	6.5	40.4	104	11200	286.3				442 10979
06-01	+80 mesh	7.6	39.8	455	10200	268.6	93.82			
06-01	-80 mesh	11.6	33.6	238	22800	17.7	6.18	0.14	0.13	
07-01	Bulk	5.6	38.2	1360	23800	281.5				1131 20034
07-01	+80 mesh	7.6	33.6	761	13400	244.3	86.79			
07-01	-80 mesh	9.8	34.5	3560	63600	37.2	13.21	0.35	0.35	
07-02	Bulk	5.1	9.2	887	2260	451.8				777 1804
07-02	+80 mesh	6.1	7.5	661	1790	437.1	96.75			
07-02	-80 mesh	6.2	8.4	4220	2230	14.7	3.25	0.15	0.03	

TABLE 2

SCREEN ASSAY OF CHAT SAMPLE NO. 01-02

PRODUCT SIZE	WEIGHT		CUMULATIVE		ASSAY, mg/kg			DISTRIBUTION, %					
MESH	GRAM	PERCENT	PERCENT	PERCENT	Pb	Zn	Cd	Pb	CUMUL	Zn	CUMUL	Cd	CUMUL
+3	5.78	1.63	1.63	100.00	110	590	0	0.4	100	1.9	100	0	100
-3+4	63.01	17.75	19.37	98.37	100	460	3	3.9	99.6	16.3	98.1	25.5	100
-4+6	67.88	19.12	38.49	80.63	100	450	2	4.2	95.7	17.1	81.8	18.3	74.5
-6+8	10.47	2.95	41.44	61.51	100	240	0	0.6	91.5	1.4	64.7	0	56.2
-8+10	94.54	26.63	68.07	58.56	200	190	0	11.7	90.9	10.1	63.3	0	56.2
-10+14	17.26	4.86	72.93	31.93	150	230	0	1.6	79.2	2.2	53.2	0	56.2
-14+20	24.62	6.93	79.86	27.07	190	320	2	2.9	77.6	4.4	51	6.6	56.2
-20+28	3.59	1.01	80.87	20.14	200	730	3	0.4	74.7	1.5	46.6	1.5	49.6
-28+35	21.84	6.15	87.02	19.13	170	820	3	2.3	74.3	10.1	45.1	8.8	48.1
-35+48	6.07	1.71	88.73	12.98	240	1100	7	0.9	72	3.7	35	5.7	39.3
-48+65	6.47	1.82	90.56	11.27	230	1100	7	0.9	71.1	4	31.3	6.1	33.6
-65+100	4.23	1.19	91.75	9.44	250	1300	8	0.7	70.2	3.1	27.3	4.6	27.5
-100+150	2.6	0.73	92.48	8.25	460	1400	9	0.7	69.5	2	24.2	3.2	22.9
-150+200	1.24	0.35	92.83	7.52	300	1400	9	0.2	68.8	1	22.2	1.5	19.7
-200+270	1.51	0.43	93.25	7.17	320	1300	8	0.3	68.6	1.1	21.2	1.6	18.2
-270+400	0.61	0.17	93.43	6.75	360	1200	9	0.1	68.3	0.4	20.1	0.7	16.6
-400	23.34	6.57	100.00	6.57	4700	1500	5	68.2	68.2	19.7	19.7	15.9	15.9
			355.06	100.00				100			100		
CALC HEAD					454.4	501.8	2.1						

SCREEN ASSAY OF CHAT SAMPLE NO. 07-01

PRODUCT SIZE MESH	WEIGHT		CUMULATIVE		ASSAY, mg/kg			DISTRIBUTION, %					
	GRAM	PERCENT	PERCENT	PERCENT	Pb	Zn	Cd	Pb	CUMUL	Zn	CUMUL	Cd	CUMUL
+3	0	0.00	0.00	100.00	0	0	0	0	0	0	0	0	0
-3+4	9.76	2.47	2.47	100.00	210	930	3	1.2	100	1.4	100	1.3	100
-4+6	164.13	41.53	44.00	97.53	240	1200	4	23.6	98.8	30.5	98.6	29.4	98.7
-6+8	131.61	33.30	77.31	56.00	250	780	3	19.7	75.2	15.9	68.1	17.7	69.3
-8+10	40.51	10.25	87.56	22.69	230	460	2	5.6	55.5	2.9	52.2	3.6	51.6
-10+14	10.27	2.60	90.16	12.44	240	780	5	1.5	49.9	1.2	49.3	2.3	48
-14+20	8.88	2.25	92.40	9.84	280	2000	12	1.5	48.4	2.8	48.1	4.8	45.7
-20+28	2.64	0.67	93.07	7.60	330	7400	35	0.5	46.9	3	45.3	4.1	40.9
-28+35	3.63	0.92	93.99	6.93	350	14000	48	0.8	46.4	7.9	42.3	7.8	36.8
-35+48	1.5	0.38	94.37	6.01	350	20000	65	0.3	45.6	4.6	34.4	4.4	29
-48+65	1.31	0.33	94.70	5.63	400	22000	70	0.3	45.3	4.5	29.8	4.1	24.6
-65+100	0.72	0.18	94.88	5.30	400	21000	60	0.2	45	2.3	25.3	1.9	20.5
-100+150	0.3	0.08	94.96	5.12	600	34000	70	0.1	44.8	1.6	23	0.9	18.6
-150+200	0.14	0.04	94.99	5.04	700	46000	20	0.1	44.7	1	21.4	0.1	17.7
-200+270	0.18	0.05	95.04	5.01	0	100000	0	0	44.6	2.8	20.4	0	17.6
-270+400	0.05	0.01	95.05	4.96	0	0	0	0	44.6	0	17.6	0	17.6
-400	19.55	4.95	100.00	4.95	3800	5800	20	44.6	44.6	17.6	17.6	17.6	17.6
			395.18	100.00				100			100		
CALC HEAD					421.7	1633.2	5.7						

FLOTATION TEST CONDITIONS
GALENA SUBSITE MINE WASTE SAMPLES
CHEROKEE COUNTY SITE, KANSAS

FLOWSHEET	PULP DENSITY	REAGENTS ADDED (POUNDS PER TON)														TIMES (MINUTES)				
		NaCO3	ZnSO4	NaCN	R242	AX325	MIBC	DF250	Ca(OH)2	CuSO4	M-1661	AX343	AF-65	81469C	6410	PEO-301	Na2S	PF-3	GRINDING CONDITION	FROTH
GRINDING 85-100% -200 mesh 2000 grams	65%	4	1	0.33																85
LEAD ROUGHER	25%																			
STAGE 1		0.9			0.03	0.01	0.02	0.008											2	3
STAGE 2					0.015														1	3
ZINC CONDITION									2.6	1.5									5	
ZINC ROUGHER																				
STAGE 1						0.02					0.02	0.02	0.021						1	3
STAGE 2									0.6		0.03	0.02	0.021						1	3
STAGE 3											0.02	0.02							1	3
BULK CONDITION														0.2					5	
BULK ROUGHER																				
STAGE 1														0.4					10	5
STAGE 2															0.05	3	0.05	(a)	15	5
STAGE 3										0.02							0.015		1	5

(a) 10 minutes condition with PEC-301, 5 minues with other reagents.

REAGENT DESCRIPTIONS

NaCO3	pH modifier
ZnSO4	(hydrated) zinc depressant
NaCN	zinc-pyrite depressant
R242	American Cyanamide collector - aryl dithiophosphoric acid
AX325	American Cyanamide collector - sodium ethylxanthate
MIBC	frother - methyl isobutylcarbonol
DF250	DOW frother - polypropylene glycol
Ca(OH)2	pH modifier
CuSO4	(hydrated) zinc activator
M-1661	Minerec collector (replacement for DOW Z200 xanthate)
AX343	American Cyanamide collector - sodium isopropylxanthate
AF-65	American Cyanamide frother - Aero-Froth 65
81469C	Lubrizol chelating agent
6410	American Cyanamide collector - alkyl hydroxamate
PEO-301	Union Carbide flocculating agent - polyethylene oxide
Na2S	sulfidizing agent
PF-3	Pennwalt collector - dodecylmercaptan

